1882.

BOROUGH OF CARDIFF.

REPORT

ON THE

Sanitary Condition of Cardiff,

FOR THE YEAR 1881,

BY

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1882.

TO THE

CARDIFF URBAN SANITARY AUTHORITY.

Cardiff, February 27th, 1882.

GENTLEMEN,

In directing your attention to the Sanitary condition of the Urban District of Cardiff during the year 1881, I may observe that the preliminary report on the census of England and Wales, taken on the 4th April, 1881, by the Registrar General, and presented to both Houses of Parliament, gave the population of this district as 85,378. The publication of the census returns removes a difficulty hitherto experienced, when it was necessary to estimate the population, in making reports from time to time to your Board. This difficulty arose from the circumstance that the district, as it is now constituted, did not exist in 1871, when the previous census was taken. Since that time it has been considerably enlarged, as in 1875, an Act was obtained to amalgamate with it the two immediately contiguous Urban Districts of Roath and Canton. Both of these, it is well known, have increased in an unprecedented degree, so that the formula adopted in other districts was totally inapplicable to this. It has therefore been necessary to seek other data when estimating the population. It is, however, satisfactory to know that the data employed have been found to be very reliable. Thus, in the report I made to your Board for the year 1880, I estimated the mean of the population for that year to be 83,389. The census return above alluded to made the population on the 4th April, 1881, 85,378 and the total increase of the district since 1871, 25,884, or an averag

annual increment of 2,588. Taking this as a basis for calculation, one fourth of the yearly increment, or 647, will have to be deducted for the months of January, February, and March; it follows, therefore, the population at the end of the year 1880 would be 84,731. A moiety of the annual increase, that is 1,294, will have again to be deducted for the later six months of 1880. This would make the population on the 30th June, 84,437, being only 48 in excess of my estimate.

In all future reports, therefore, for the next decennial period, I shall estimate the annual increase at 2,588 or at the rate of seven per day.

The following table gives the several census returns for Cardiff since 1801, with the average yearly increase during each decennial period :—

Table A.

Census Years.	Population.	Average yearly increase during decennial period.
1801	1,870	
1811	2,577	70
1821	3,521	94
1831	6,187	266
1841	10,077	389
1851	18,351	827
1861	32,054	1,370
1871	39,536	748
*1871	59,687	
1881	85,371	2,588

The average yearly increase has been rapid and progressive. The decline of the average between 1861 and 1871 is more apparent than real, and arose from the circumstance that the ground available for building purposes was becoming very limited, and house accommodation for those connected with the trade and commerce of the town was provided at Roath and Canton, which were not then included in this district.

I shall now allude, as has been my custom in all former reports, to some direct or collateral causes, which exercised a considerable influence on the public health of this district, during the past year.

METEOROLOGY.

In the summer of 1881, Dr. Ballard, Inspector under the Local Government Board, visited Cardiff, for the purpose of enquiring into circumstances connected with the prevalence of zymotic disease in this district, especially Diarrhœa, and he expressed an opinion that it was very desirable certain Meteorological observations should be conducted so as to ascertain how far these operated as pre-disposing or excitant causes of this class of disease. He suggested to a committee of your Board that I should be provided with certain Meteorological Instruments necessary for this purpose; and furnished a list which with his suggestions met with your approval. The Instruments have been obtained and are now in working order. The following are the Meteorological observations of each month, with the total mortality, and death-rate, also the death-rate from the seven chief zymotic diseases.

The rainfall of the year 1881, as observed by Mr. W. Adams, C.E., F.G.S., at his residence, Cambridge House, Park Place, Cardiff, is shown by the subjoined table :—

Latitude, N., 51 deg., 9 min., 10 sec.
Longitude, W., 3 deg., 9 min., 55 sec.
Diameter of Receiver of Gauge, 5 inches.
Height above ground 1 Foot.
Height above sea-level, 43 feet.

Month.	Total depth.	Greatest fall in 24 hours.	Date.	Days on which ·01 inch or more fell.
January	·92	·23	26th	12
February	4·81	1·12	9th	15
March	3·88	·68	3rd	16
April	1·44	0·60	13th	7
May	2·62	1·73	17th	10
June	3·59	0·63	16th	18
July	2·62	0·77	30th	15
August	6·94	1·45	22nd	20
September ...	2·09	0·48	24th	13
October	3·23	0·72	22nd	13
November ...	4·98	0·65	26th	23
December ...	4·50	1·77	7th	15
	41·62			177

The following table illustrates the rainfall for the year 1881, and six previous years :—

Month.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
	Inches	Inches	Inches	Inches	Inches	Inches	Inches
January ...	5·87	1·91	5·77	1·73	4·71	·87	·92
February ...	2·08	5·33	2·79	3·07	5·95	3·88	4·81
March ...	1·66	3·92	2·66	1·25	1·14	1·90	3·88
April ...	2·65	2·70	2·90	4·10	2·64	1·98	1·44
May	2·93	0·23	2·47	4·32	2·85	1·45	2·62
June... ...	5·34	1·91	1·48	3·68	6·48	2·38	3·59
July	6·27	1·24	4·94	2·01	4·00	6·64	2·62
August ...	3·82	6·06	5·70	10·82	8·12	·77	6 94
September	4·05	7·08	3·25	3·21	4·85	3·67	2·09
October ...	7·80	3·84	4·89	5·76	1·51	4·94	3·23
November	7·78	5·27	6·54	3·06	0·43	3·67	4·98
December	1·74	7·13	3·40	2·70	2·11	6·70	4·50
	51·99	46·62	46·79	45·71	44·79	38·85	41·62

The rainfall for 1881 has been 1·62 below the average of the ten preceding years.

JANUARY.—The month of January was very mild during the first week, after which intense cold set in, continuing until the 27th, when the weather again became mild. On the 18th there was a very heavy fall of snow. The highest reading of the barometer was 30·354in., on the 7th ; the lowest 28·809in., on the 29th ; the mean for the month was 29·833in. The temperature was considerably below the ordinary average of the month. The maximum temperature in the shade was 46·9°, on the 31st. The minimum 13·5°, on the 23rd. The mean of maximum 36·8°. The mean of minimum 27·5°. The average for the month was 32°. The temperature was at or below 32° on 19 days. The mean of hygrometer dry bulb 30.2, wet bulb 29·4. There were 12 days on which 0·01in. or more of rain fell. The greatest fall in 24 hours was on the 26th, when it measured 0·23in. The total rainfall for the month was 0·92in.

The total deaths registered during the month were 176, yielding a death-rate of 24·4 per 1,000 inhabitants per annum, 2·2 of which was due to the seven chief zymotic diseases.

FEBRUARY.—The mild weather of the last four days of January continued for a few days with a slight preponderance of easterly winds. The barometer was highest at 30·302in., on the 24th; lowest at 29·109in., on the 11th. The mean for the month being 29·834in. The maximum temperature, 50 9°, occurred on the 2nd. The minimum 29.2° on the 12th. The mean of the maximum readings was 43·2°. The mean of minimum 36·1°. The mean for the month was 39·6°. The temperature was at or below 32° on seven days. The mean of hygrometer dry bulb was 38·5, and of wet bulb 37·2. There were 15 days on which 0·01 or more rain fell in 24 hours. The greatest fall in 24 hours was on the 9th, when it measured 1·12in. The total rainfall for the month was 4·81 inches.

The total deaths registered during the month were 125, showing a death-rate of 19·1 per 1,000 inhabitants per annum. The death-rate of seven chief zymotic diseases was 1·5.

MARCH.—The weather of March was variable, the prevalent winds were westerly. The barometer stood highest at 30·508in., on the 17th; lowest at 29·203in., on the 7th. The mean for the month being 29·878in. The maximum temperature registered was 56·9° on the 17th. The minimum 24·9° on the 1st. The mean of the maximum readings was 43·9°. The mean of minimum 37·6°. The mean for the month was 40·6°. The mean of hygrometer dry bulb indications was 42·2; of wet bulb 40·2. There were 16 days on which 0·01in. or more of rain fell. The greatest fall in 24 hours was on the 3rd, when it measured ·63in. The total rainfall for the month was 3·88 inches.

The total deaths registered during the month were 154, indicating the death-rate as 21·2 per 1,000 inhabitants per annum, to which the seven chief zymotic diseases contributed 2·1.

APRIL was fine and dry; the winds more or less N.E. The barometer stood highest at 30·224in., on the 28th; lowest 29·766 on the 6th. The mean for the month being 29·929. The maximum temperature was 68·3° on the 13th. The minimum 30·0° on the 4th. The mean of the maximum readings was 55·2°. The mean of minimum 40·3°. The mean temperature of the month was 47·8. The thermometer stood at or below 32° on three nights. The mean hygrometer dry bulb was 46·0; of wet bulb 42·1. There were seven days on which 0·01in. or more of rain fell. The greatest fall in 24 hours was on the 13th, when it measured ·6in. The total rainfall for the month was 1·44in.

The total deaths registered during the month were 114, shewing a death-rate of 16·2 per 1,000 inhabitants per annum. The death-rate of seven chief zymotic diseases was 2·0.

May was fine and generally dry, with W. winds. The barometer was highest 30·621in., on the 10th; and lowest 29·538in., on the 19th. The mean for the month being 30·066in. The maximum temperature 76.3° occurred on the 31st. The minimum 35·6° ou the 11th. The mean of maximum was 63·4°; of minimum 46·7° The mean for the month 55°. The average of the hygrometer dry bulb indications was 54·8°; of wet bulb 50·4. There were 10 days on which 0·01in. or more of rain fell. The greatest fall in 24 hours was on the 17th, when it measured 1·73 in. The total rainfall for the month was 2·62 inches.

The total deaths registered during the month were 118, shewing that the death-rate was 16·2 per 1,000 per annum, to which the seven chief zymotic diseases contributed 2·2.

June was damp and cold. The prevailing winds S.W. The barometer stood highest at 30·242in., on the 30th; and lowest 29·446in. on the 21st. The mean for the month was 29·276in. The maximum temperature 77° was on the 1st. The minimum 36·4° on the 8th. The mean of the maximum readings was 64·5°; of minimum 50·3°. The mean of the month was 57·4°. The mean of hygrometer dry bulb observations was 58·1; of wet bulb·53·8. There were 18 days on which 0·01in. or more of rain fell. The greatest fall iu 24 hours was ·63in., on the 16th. The total rainfall for the month was 3·59 inches.

The total deaths registered during the month were 113, yielding a death-rate of 15·9 per 1,000 inhabitants per annum. The death-rate due to the seven chief zymotic diseases was 0·8.

July was wet and showery. Westerly winds prevailed. The barometer read highest at 30·278in., on the 14th; lowest at 29·385in., on the 31st. The mean for the month being 29·969in. The maximum temperature 83° was on the 6th. The minimum 43·4° on the 28th. The mean of maximum was 69·9°; of minimum 54·3°. The mean for the month was 62·1°. The mean of hygrometer dry bulb indications was 61·8; of wet bulb 57·9. There were 15 days on which 0·01in. or more of rain fell. The greatest fall, ·77in., occurred on the 30th. The total for the month was 2·62 inches.

The total deaths registered during the month were 121, shewing that the death-rate was 16·6 per 1,000 inhabitants per anuum. Of this 1·5 was due to the seven chief zymotic diseases.

August was occasionally cold, wet, and unseasonable. W. winds still continued. The barometer was highest at 30·285in., on the 4th; aud lowest at 29·389in., on the 26th. The mean for the month

being 29·823in. The maximum temperature 77·9° was on the 5th. The minimum 32·6° was on the 28th. The mean of maximum was 65·3°; of minimum 52·2°. The mean for the month, 58·8° was mueh below the average. The mean hygrometer dry bulb indication was 59·1 ; wet bulb 56·3. There were 20 days on which 0·01in. or more of rain fell. The greatest fall in 24 hours oeeurred on the 22nd, when it measured 1·45in. The total for the month was 6·94 inches.

The total deaths registered during the month were 106, and the death-rate was 14·4 per 1,000 inhabitants per annum. The death-rate of the seven ehief zymotic diseases 2·3.

September was drier and finer than the preceding month, with prevalenee of N.E. winds.

The barometer read highest at 30·346in. on the 29th ; and lowest at 29·348in. on the 21st. The mean for the month being 29·968in. The maximum temperature 69·6° was on the 18th, and the minimum 42·3° on the 16th. The mean of the maximum readings was 62·9°, of the minimum 49·1°. The mean for the month was 56°. The mean of hygrometer dry bulb indieations gave 35·4, of wet bulb 53·1. There were 13 days on which 0·01in or more of rain fell. The greatest fall in 24 hours was on the 24th, when it measured ·48in. The total rainfa for the month was 2·09in.

The total deaths registered during the month were 125, yielding the death-rate of 17·5 per 1000 inhabitants per annum. To this the seven chief zymotic diseases eontributed 1·4.

October was eold with alternations of fine and wet weather, N.E. winds predominating. The barometer stood highest at 30·499in. on the 7th, and lowest at 29·118in. on the 14th ; the mean for the month being 29·986in. The maximum temperature 61·5° oecurred on the 11th, and the minimum 27° on the 31st. The mean of the maximum readings was 53°, of the mininum 41·6°. The mean for the month, 47·3°, was below the average. The mean of hygrometer dry bulb was 46·3, of wet bulb 44·1. There were 13 days on which 0·01in. or more of rain fell ; the greatest fall in 24 hours being ·72in. on the 22nd. The total rainfall for the month was 3·23in.

The total deaths registered during the month were 117, showing that the death-rate was 15·8 per 1,000 inhabitants per annum. The death-rate due to the seven chief zymotic diseases was 2·6.

November was very wet and mild, with a prevalenee of S.W. winds. The barometer was highest at 30·382in. on the 13th, and lowest at 29·217in. on the 28th ; the mean for the month being 29·973in. The temperature was much above the average. The maximum 59·8° was on the 4th, the minimum 30·8° on the 1st. The mean of the

maximum readings was 53·9°, of minimum 4·55°; the mean for the month being 49·7°. The mean of the hygrometer indications was: dry bulb 48·5 wet bulb 4·71. There were 23 days on which 0·01in. or more of rain fell, The greatest fall in 24 hours was on the 26th, when ·65in. was measured. The total rainfall for the month was 4·98in.

The total deaths registered during the month were 151. The death-rate was 21·1 per 1000 inhabitants per annum, to which the death-rate of the seven chief zymotic diseases contributed 2·8.

December was alternately wet and dry, with many foggy days. The wind was chiefly from the west.

The barometer read highest at 31·06in, on the 2nd, and lowest at 28·982in. on the 20th. The mean for the month was 29·985in. The maximum temperature 53·6° occurred on the 2nd, and the minimum 24·4° on the 24th. The mean of maximum was 45·5°, of minimum 36·8. The mean for the month 41·1°. The mean hygrometer indications: dry bulb 40, wet bulb 39·2, There were 15 days on which 0·01in, or more rain fell. The greatest fall in 24 hours occurred on the 7th, when 1·77in, was registered. The total rainfall for the month measured 4·50in.

The total deaths registered during the month were 126; the death-rate being 17·6 per 1000 inhabitants per annum. The death-rate attributable to the seven chief zymotic diseases was 1·3.

WATER SUPPLY.

Well Waters.

During the year 13 samples of well water from various parts of the Borough were submitted for analysis. Ten of these samples proved to be so contaminated, that at my request proceedings were taken and orders obtained for the permanent closing of the wells. In the old Borough very few wells exist which supply water for drinking, and during the past six years a great number have been closed by representing to the owners that the water was prejudicial to the health of those drinking it, whilst in other instances—and those were not few—proceedings were taken against the owners of the premises, and the wells closed by magisterial order. I have previously directed your attention to the constituent elements of these town waters, and pointed out the essential features in which they differ from natural and unpolluted waters, and as these same differences are always observable no further reference need be made thereto. A question which frequently crops up—and which was asked recently at a hearing of cases for closing wells in certain premises—is, "From what source does the oxidation products of sewage find their way into the well waters of the town? Is it from cesspools, or leakage from the

pipes carrying the sewage from the closets to the sewers?" I think it well to refer to this question, as the answer thereto adds additional weight to existing evidence shewing the absolute necessity for closing all wells in large towns; especially those, like Cardiff, where the subsoil is chiefly gravel or other porous material. (1st) with regard to cesspool soakage :—In the old Borough where main sewers have so long been constructed, the active nitrogenous cesspool matters must have become oxidised and removed, hence it is not probable that much of the oxidation products of sewage and animal matters found in the well waters of Cardiff is derived from cesspool soakage : (2nd) with regard to leakage from earthenware socket drain pipes :—Unless these are thoroughly cemented at the joints, and in nineteen cases out of twenty they are not, diffusion always takes place between the water in the damp earth around and the liquid in the pipes ; and when the subsoil is sending a rapid current of water to the sewers (below the line of the earthen pipes), the suction caused in the earth above induces the withdrawal of the liquid sewage from the pipes, and thus assists natural liquid diffusion. In this manner the subsoil becomes more or less saturated with liquid sewage, which is rapidly oxidised in gravel strata. Whilst this pollution is of itself sufficient to render town wells dangerous to health by reason of the germs of disease resisting the effects of, and not being removed by, active filtration—it is from the sewers that the greatest amount of pollution comes. The tendency of all liquid sewage to diffuse and dialyse, however slow the process may be in some cases—is an element of danger; but when ample means of communication exist by which an admixture of the liquid sewage in the drain and the subsoil water outside can readily take place, it stands to reason that any well sunk beneath the level of the sewer will be simply a catch-pit for sewer soakage. Some persons labour under the misapprehension that brick sewers are made watertight, but this is a fallacy, and it would not be always desirable that they should be so made, as the removal of the excess of subsoil water prevents the strata becoming water-logged, and the damp that would otherwise be experienced in the ground floors of houses. That this intermixture of the liquids from drains and sewers takes place is well established, and is in harmony with known scientific laws, but in addition to this the chemical constituents of the well waters prove conclusively that this is the case. For these and other reasons referred to in previous reports, I urge that all wells in the town should be permanently closed, unless their use is restricted to manufacturing purposes only. It is right to add, however, that there are a few well waters in the outskirts of the Borough which have so far retained their pristine purity as not to be considered dangerous to the health of persons drinking such waters. The reason is because the flow of the subsoil water is toward the old town, and because the nature of

the upper strata is close and retentive, thus preventing drain and cesspool soakage finding its way into the well. As soon as any perceptible change is found to occur, however, I shall recommend that the water be no longer used for drinking. In the table of analyses two instances are given of the composition of waters from wells closed by order during the year.

Ely Water Supply.

Some time ago it was proposed to increase the quantity of water distributed from the Ely Pumping Station, and to this end works are now in rapid progress. The yield of water by the present underground tunnel is computed at from 750,000 to 1,000,000 gallons per day, and when the new extension is completed, it is anticipated that at least 500,000 gallons will be added to the present supply. By reason of the rocky character of some of the strata, the 1,000,000 gallons per day estimated as obtainable will not be realised. The extensions at Ely were intended not so much for a permanent supply for the town as a present supply to tide over the existing scarcity of water, until some suitable source was selected, and a good scheme matured. It is very satisfactory to note that two very favourable schemes are under consideration, and these, with others less attractive, I shall very briefly allude to :—

Aber Scheme.

The Aber Brook with its three main branches uniting at Abertridwr, drains a district which embraces a gathering ground, said to be 2,700 acres in extent. By reason of its considerable elevation above the sea and its mountainous character, the rainfall is very large, and the total yield of water will possibly reach 4,000,000 gallons per day. It is variously estimated at from $3\frac{1}{2}$ to 5 million gallons per day. The geological features of the gathering ground are characterised chiefly by the Pennant grit and sandstone rocks of the upper coal measures. Ferns grow somewhat abundantly upon the mountains and the water falling upon the decayed fronds acquires a slight yellow or brown tinge, but the vegetation is poor, and the water does not take up any active organic matter The analysis of this water given in the table shews that it is, in every respect, well adapted for a town supply.

Taff Vawr Scheme

The chief tributary of the Taff River, known as the Taff Vawr, rises in the Brecon Beacons, and drains in the upper part of its course an available gathering ground of no less than 10,000 acres in extent. The geological formation is chiefly the old Red Sandstone. By far the greater portion of the gathering ground consists of mountain pasture not in a high state of cultivation, and the rain falling thereon does not become much impregnated with either organic or mineral matter. In fact the water of the Taff Vawr is everything that can be desired for a town supply. The supply is

practically unlimited and 20,000,000 gallons per day might be obtained.

Whitchurch and Rudry Brooks and Taff Vychan Scheme.

Since the Taff Vawr and Aber schemes have been under consideration various other sources are receiving some attention, and samples of water were analysed from the Whitchurch and Rudry Brooks. These waters are procurable only in small quantity, and the analyses shew them to be vastly inferior to the water of the Aber and Taff Vawr streams. It was ascertained that a large volume of water leaked and run waste from the Merthyr Reservoir, and some overtures were made with the Merthyr Local Board respecting a supply for Cardiff, but the results of these negociations shew that there is no likelihood of water being obtained from that souree.

General Remarks.

The Water question, as it stands, may be summarised thus :—Both the Taff Vawr and the Aber Streams will yield water well suited for a town supply. I shall briefly notice to what extent the supply will be available as this is a matter dependent upon the population —the cost and engineering difficulties being outside of my province. It is not probable that the great increase of population which has characterised Cardiff during the past decade will be maintained in the future—in other words, the same geometric increase is not likely to be continued during the next ten years; but it seems nearly certain that 35 years hence the population of Cardiff will reach a total of 200,000. When the Ely Extension system is complete it is computed that 2,500,000 gallons per day can then be distributed in Cardiff, which will give 25 gallons per head for 100,000 of population. If 4,000,000 gallons per day can be obtained from the Aber Valley, this would yield 25 gallons per head to 160,000 people. The Ely, Llanishen, and Aber supplies would give therefore, in the aggregate, 25 gallons per head to 260,000 of population. It appears from the evidence of the best authorities on the subject, that one-third only of the 25 gallons is used for domestic purposes, the other two-thirds being consumed in sanitary and manufacturing operations. No one would doubt it was desirable that all water for drinking and household purposes—and I may add manufacturing purposes also—should be supplied from the pure and soft water that would be furnished by either the Taff Vawr or the Aber Streams; and if some of the present mains were set apart for sanitary purposes and supplied from the Ely and Llanishen sources, the Aber, as well as the Taff Vawr might be made to furnish the quantity of water necessary for domestic purposes to a very large population. In fact, if 20 gallons per head were required for domestic and manufacturing purposes, 4,000,000 per day would supply 200,000 persons—the probable population of Cardiff 35 years hence.

RESULTS OF ANALYSES OF SAMPLES OF WATER, expressed in parts per 100,000,

BY J. W. THOMAS, F.C.S.

DESCRIPTION.	Total Solid Matter.	Albuminoid Ammonia.	Free Ammonia.	Nitrogen as Nitrates and Nitrites.	Total Nitrogen found.	Previous Sewage or Animal Contamination.	Chlorine.	Hardness.			REMARKS.
								Temporary	Permanent	Total.	
Sample marked B. Well-water ...	83·0	·008	·004	3·846	3·856	38,140	6·50	13·8	30·8	44·6	clear and colourless
Sample marked No. 33. Well-water	104·9	·007	001	6·533	6·540	65,010	10·95	9·7	51·4	60·1	nearly clear and colourless
Water from Ely Pumping Works...	31·2	·006	—	·059	·064	slight	1·50	15 0	11·1	26·1	clear
Water from Llanishen Reservoir (filtered)	22·8	·0085	·0026	·047	·056	—	1·15	9 0	9·4	18·4	slight peaty colour, clear
Water from Aber Brook	6·3	·0070	·002	·023	·030	—	·95	·3	3·5	3·8	faint yellow colour, nearly clear
Water from Taff Vawr Stream ...	6·4	·0055	·003	—	·008	—	·75	·	4·3	4·4	faint yellow colour, nearly clear
Water from Rudry Brook	22·2	·006	·005	·059	·068	—	·95	6·4	11·3	17·7	practically colourless
Water from Whitchurch Brook ...	25·6	·008	·004	·024	·034	—	1·15	8·1	13·2	21·3	practically colourless

THE FOOD SUPPLY.

The character of the food and the possible dangers to be apprehended from the use of meat obtained from animals suffering from disease, necessarily occupy the attention of Officers of Health, especially in large Urban Districts, such as this, where a considerable portion of the meat supply is derived from a distance.

There are cases of sporadic fever constantly coming under the observation of the Medical Practitioner where no excitant cause of disease can be discovered. The locality may be well drained, and, as far as is known, free from any infectious disease. The house may be efficiently sewered, the rooms lofty and not overcrowded, clean and well-ventilated, the water supply pure, and yet the case may possess all the essentials of zymotic disease. It then necessarily forces itself to the mind, can the contagion be introduced by the ingesta?

In favour of this hypothesis I may state that there are epizootic diseases of an infectious character, which at times prevail among animals. A post-mortem examination sometimes shews maculæ on the skin, hyperæmia of the mucous tracts and ulceration of the intestinal glands analogus, if not identical, to the post-mortem appearances of fatal cases of enteric fever in man.

According to Professor Gamgee the flesh of over-driven animals contains a poison which often produces eczema on the hands of those who handle it, and which may when eaten be attended with bad effects.

The following are some of the diseases which it is now admitted are communicable to man.

Tuberculosis. (Phthisis).
Anthrax and Malignant Pustule Fever.
Epizootic Pleuro-pneumonia.
Foot and mouth disease (Aphtha, or eczema epizootica).
Cattle-plague (Rinderpest, Typhus contagious).
Erysipelas.
Swine Typhoid.

The Rot in Sheep (Fluke disease due to the presence of the parasite Diostoma hepaticum in the liver).

Pig Measles occasioned by the presence of the parasite Cipticusus cellulosus in pigs' flesh, giving rise to tœniasolium or tape-worm in man.

Trichinosis, from the Trichina spiralis, also found in pig flesh.

Of these Epizootic diseases only two (Swine typhoid and Rot in Sheep) have occurred in this district during the year, a result due to

the action taken by the Urban aud County Committees appointed to carry out the provisions of the Contagious Diseases (Animals) Act, and is very satisfactory, as it is known that Foot and Mouth Disease existed in many localities in this kingdom. The measures taken to repress and stamp out Swine Fever, which on many occasions threatened to assume some magnitude, were very successful; and I am enabled to say that a careful supervision exercised over the Meat Market detected no carcase of an animal suffering from this disease which was exposed for sale. Furthermore, I may state generally that a great improvement in the quality of the Meat Supply has eventuated since this continuous inspection has been established. I have now to report that only two seizures of meat in a diseased state have been necessary during the year. On the 4th of March five carcases of mutton in a very advanced state of Rot were found in a butcher's shop dressed for sale. These were destroyed by magisterial order, and further proceedings against the butcher being taken, a penalty of £25 and costs was inflicted. On the 1st of July a carcase of beef in the morbid condition described by Professor Gamgee, rendering it unfit and unsafe if used for human consumption, was found in a butcher's shop. The flesh and fat were much altered in color and appearance, being very hyperœmic, as if the animal had been suffering from some constitutional disturbance of a febrile character. Extravasations of serum—and, in some instances, semi-purulent serum—were found on many parts of its surface. Marks of severe contusions existed on the neck and shoulder. On enquiry it was ascertained that the grazier found it almost in a dying state, and had sent for a butcher to kill it. He considered it so bad that he sold it to the butcher for a few shillings, the supposed value of the hide; but the butcher afterwards dressed it for the purpose of sale. The carcase was ordered to be destroyed, and on further proceedings being taken, the Magistrates considered it a very aggravated case, and inflicted a penalty of £20 and costs.

The sanitary inspection of Cowsheds now adopted with enforced hygeinic regulations is calculated to improve the condition of the animals housed in them; and, as a necessary consequence, the quality of the milk is materially improved,—a matter of great consideration when it is known that milk enters largely into the dietary of infant life. Whilst referring to the quality of the milk, I may here remark that in my last yearly Report to your Board I dealt with the question to what extent milk influenced the prevalence of diarrhœa among infants during the summer months; and I think it of sufficient importance to suggest that during the months of July, August, and September a larger number of samples of milk should be submitted for examination to Mr. Thomas, in order that every safe-

guard be taken to minimise intestinal irritation which, in my opinion, is at times produced by this article of diet.

DWELLINGS OF THE WORKING CLASSES.

An inspection of these has been maintained throughout the year, and daily reports are furnished to me by your Sanitary Inspectors, giving in detail the general condition of the interior of the house, the number of occupants in each, the presence or absence of sickness, and if the latter is found, its specific character. These reports throughout the year have been most satisfactory. Fewer cases of overcrowding were reported than on any previous year, and when such have occured, a notice served on the occupier to reduce the number of inmates has been most readily complied with, so that it was rarely necessary to take further proceedings.

An improvement has been observed as regards the cleanliness and ventilation of sleeping apartments.

The sewer arrangements of each house have been under constant inspection, and when anything defective was observed, immediate steps were taken to have it remedied. The result has been that an improvement took place in the general health of the labouring classes, whilst a reference to form B in the Appendix will shew that the District Union Officers' Books return a minimum amount of sickness of a zymotic character among classes coming under the observation of those officers.

THE MARRIAGES.

The marriages during the year 1881 were as follows :—

Church of England	278
Chapels	136
Synagogue	2
Registrar's Office	403
Total	819

Being at the rate of 9·5 per 1,000 inhabitants per annum.

THE BIRTHS.

The births were 3,145; this was an excess of 252 over the previous year. The birth rate of the District was 36·5 per 1,000 per annum, that of the Kingdom being 23·9, but if we deduct 7,000 as the estimated average number of seamen in the Port whose families reside elsewhere and who do not contribute to our birth rate, but who do to the death rate, the birth rate would have been 39·8 per 1,000.

The births were registered as follows :—

	Cardiff.	Roath.	Canton.	Total.
Quarter ending March ...	389	285	147	821
„ „ June	381	249	167	797
„ „ September...	392	254	142	788
„ „ December ...	388	199	152	739
	1550	987	608	3145

THE DEATHS.

The deaths registered in the Urban Sanitary District of Cardiff, during the year were 844 males and 712 females, making a total of 1,556.

The deaths were distributed throughout the district as follows :—

	Cardiff.	Roath.	Canton.	Total.
Winter Quarter ending March ...	292	111	52	455
Spring „ „ June ...	229	84	34	347
Summer „ „ Sept. ...	230	65	57	352
Autumn „ „ Dec. ...	248	81	73	402
Total ...	999	341	216	1556

It will thus be seen that the highest rate of mortality throughout the year was attained during the winter quarter, and arose from the excessively cold weather, which prevailed more or less during the months of January and February, causing undue mortality from

acute inflammatory affections of the respiratory organs. This circumstance was especially marked in January. The first ten days of this month were unusually mild, and the death rate was as low as 18 per 1,000 inhabitants; after this, sudden and intense cold set in and the death rate rose weekly from 24 to 27, and ultimately to 28 per 1,000. On the return of mild weather a subsidence in the death rate followed, continuing during the greater part of February and the first week in March, to rise again with the severe weather of the middle and latter end of the month. The genial weather of the spring months operated favorably on the public health, while the absence of excessive heat during the summer months of July, August, and September, was marked by a diminished death rate, due to the minimum amount of the infantile epidemic, diarrhœa, which generally prevails at this period of the year.

The following tables have been constructed for the purpose of illustrating the present sanitary condition of this district. Table B. gives the progressively increasing population of each year, with its corresponding number of deaths since 1875, when this district was formed; with the mean deaths and death rate of these years as compared with the total deaths and death rate of 1881 :—

Table B.

YEARS.	1875.	1876.	1877.	1878.	1879.	1880.	Mean of six years.	Death Rate.	1881.	Death Rate.
Estimated Population	70,487	73,075	75,662	78,251	83,839	83,427	76,957	.....	86,015	.....
DISEASES :										
Zymotic	377	399	308	254	186	346	311·6	4·04	222	2·58
Constitutional ...	378	291	274	289	257	303	298·6	3·88	296	3·44
Local	491	499	616	628	698	680	602·	7·82	725	8·43
Developmental ...	182	137	166	190	188	201	177·3	2·30	210	2·44
Violent	119	129	111	107	99	104	111·5	1·45	103	1·20
Total	1547	1455	1475	1468	1428	1634	1501	19·50	1556	18·09

This table shews a minimum death rate of 18·09 in 1881, as against 19·5 the mean of the six years. That this result is favorable, can be shown by comparing the death rate ruling that of the chief towns, the small towns and rural districts, and the average of the Kingdom generally, as will be seen by the subjoined table.

Table

	Quarter ending :— March	June	Sept.	Dec.	
Cardiff	21·3	16·0	16·2	18·0	18·1
134 districts and 57 sub-districts comprising chief towns	22·9	19·4	18·5	25·0	20·3
The remaining districts and sub-districts, comprising chiefly small towns and country parishes	19·6	17·4	14·2	15·9	16·8
Average death rate of the whole Kingdom	21·6	18·6	16·7	18·6	18·9

From the above table it appears that the rate of mortality of the Urban Sanitary District of Cardiff was 2·2 per 1,000 less than that of the chief towns, 1·3 per 1,000 more than the small towns and country parishes, and ·8 per 1,000 less than that of the mean death rate of the Kingdom.

The deaths at age were :

Under one year	415
One year and under five years	186
Five years and under fifteen years ..	55
Fifteen years and under twenty-five years	113
Twenty-five years and under sixty years	526
Sixty upwards	261
	1556

The deaths under one year of age were at the rate of 130 per 1,000 births.

The comparative rate of mortality, under one year of age, to 1,000 births is as follow :

	The Kingdom.	The Large Towns.	Cardiff.
Quarter ending March	134	140	133
„ „ June	121	135	122
„ „ Sept.	138	187	112
„ „ Dec.	129	148	153
The Year	130	153	130

The following is a classification of the deaths as they were registered throughout the year :—

QUARTER ENDING

	March		June		Sept.		Dec.		Total year	
Mean population	85,173		85,802		86,446		87,088		86,015	
DISEASES.	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Zymotic	53	0·6	47	0·5	59	0·6	63	0·7	222	2·58
Constitutional ...	69	0·7	71	0·8	80	0·9	76	0·8	296	3·44
Local	246	2·8	162	1·8	142	1·6	175	2·0	725	8·43
Developmental .	59	0·6	46	0·5	46	0·5	59	0·6	210	2·44
Violent	28	0·3	21	0·2	25	0·2	29	0·3	103	1·20
	455	5·3	347	4·0	352	4·1	402	4·6	1556	1809

In the Appendix will be found a table illustrating the number of deaths from each cause, with the proportionate rate of deaths per 1,000 inhabitants, and the mean average death rate of the Kingdom, extending over a period of 30 years.

I have also given two tabular forms constructed in accordance with directions of the Registrar General, to show the mortality arising from those diseases which are considered to be, more or less, under the influence of sanitary provisions; also, the extent of sickness amongst the working classes admitted into Public Institutions and Union districts.

The diseases more or less amenable, if not altogether preventible, are usually designated the seven chief Zymotic diseases. To enable you to form an estimate to the extent of which these seven diseases have prevailed, and the effects of sanitary measures carried out under your Board, I subjoin table C. which shews the mortality and death rate resulting from these diseases, in the district during 1881, with that of the six preceding years, also the mean of the six years.

The deaths from the seven zymotic diseases occurred in the following streets and institutions :—

CARDIFF.

Name of Street.	S. Pox.	Measles.	Scarlatina	Dip'theria	W. Cough	Fever.	Diarrhœa.
Adelaide Street	...	...	...	...	...	1	...
Belgrave House	...	...	...	...	...	...	1
Bedford Street	...	...	...	1	...	..	...
Bute Terrace	...	...	...	...	...	...	1
Bute Road	...	...	...	...	1	...	...
Bute Street	...	...	...	...	1	...	...
Bute Buildings	...	...	...	...	...	1	...
Cairns Street	...	...	...	...	...	1	...
Cathays Terrace ...	...	...	1	...	2	...	...
Christina Street.....	...	...	...	...	1	...	...
Castle Road	...	...	...	...	1	...	...
Crwys Cottages	...	...	...	...	...	...	1
Crichton Street	...	...	...	...	...	...	1
Castle Road	...	...	1	...	...	...	...
Coldstream Terrace .	...	...	...	1	...	...	...
Dudley Street	...	...	...	...	1	...	...
Edward Street	...	...	...	...	...	1	...
Eisteddfod Street ...	...	...	...	...	...	...	1
Frederica Street.....	...	...	...	1	1	...	...
Flora Street	...	...	1	...	1	...	...
Frederick Street ...	...	...	1	...	...	...	1
Francis Street	...	...	...	...	...	...	1
Godfrey Street	...	...	...	...	...	1	...
Gough Street	...	...	1	...	1	...	...
George Street.....	...	...	...	...	...	...	1
George Street(Upper)	...	...	...	...	2	...	...
Guildford Street ...	...	...	...	...	1	...	...
Hamadryad, The ...	2	...	...	...	...	2	...
Hills Terrace	...	...	1	...	...	...	...
Havelock Street.....	...	...	1	...	...	...	...
Hodges Row	...	...	...	...	1	...	...
Hannah Street	...	...	...	...	1	...	...
Letty Street	...	...	...	...	...	...	1
Luton Place, South .	...	...	...	...	...	...	1
Mark Street	...	...	...	...	...	...	1
Moira Crescent	...	..	...	...	...	...	1
Maria Street	...	...	...	...	1	...	1
Masons Arms Court.	...	...	...	...	...	...	1
Pendoylan Street ...	...	...	1	...	...	1	1
Penlline Street	...	...	...	...	...	...	1
Quay Street	...	...	...	...	1	1	...
Richmond Road.....	..	...	2	...	1	...	1
Station Terrace, Lwr	...	...	...	...	...	1	...
Sophia Street..	...	...	...	...	1	1	...
Stuart Street	...	...	...	1	...	...	...

CARDIFF.

Name of Street.	S. Pox.	Measles.	Scarlatina	Dip'theria	W. Cough	Fever.	Diarrhœa
Stanley Street	...	...	...	...	..	...	1
Scott Street	...	...	...	...	2	...	1
Sandon Street	...	...	...	...	2	...	...
Tredegar Street.....	...	...	...	...	...	1	...
Tyndall Street	...	...	...	...	1	2	1
Union, The	...	...	...	...	...	...	9
Union Street	...	..	...	...	1	...	...
Vachell's Row	...	...	...	2	...	...	...
Windsor Place	...	...	...	...	1	...	...
William St., South	...	...	...	...	1	...	...

ROATH.

Auther Street.....	...	...	...	1	...	...	...
Broadway, The	...	...	...	...	2	1	1
Bertram Street	..	...	...	...	2	...	...
Charles Street	...	...	1	...	...	...	...
Constellation Street	...	...	...	...	1	...	...
Clifton Street.....	...	...	...	...	3	...	...
Clive Street	...	...	...	...	...	...	1
Cecil Street	...	...	...	...	...	...	1
Comet Street.....	...	...	...	...	...	...	2
Diamond Street.....	...	...	...	...	2	...	...
Eclipse Street	...	...	1	...	...	...	...
Gwendoline Street...	...	...	...	...	...	...	1
Helen Street	...	...	1	...	4	...	...
Inchmarnock Street.	...	1	1	...	...	...	...
Iron Street.....	...	...	...	1	...	...	...
Lily Street.....	...	...	...	...	...	1	...
Metal Street	...	...	1	...	1	...	...
Milton Street.....	...	...	...	...	1	...	...
Maud Street	...	...	...	...	1	...	...
Pearl Street	...	...	...	...	2	...	...
Rose Street	...	...	1	...	...	...	...
Ruby Street	...	...	...	...	...	1	...
System Street	...	...	...	2	...	...	1
Sanquhar Street.....	...	...	...	...	1	...	...
Shakespeare Street .	...	...	...	...	1	...	...
Tyler Street	...	...	1	...	...	...	...
Sapphire Street	...	...	...	...	...	...	1
Topaz Street	...	...	...	...	3	...	1
Wordsworth Street .	...	...	1	...	...	...	...

CANTON AND GRANGETOWN.

Names of Street.	S. Pox.	Measles.	Scarlatina	Dip'theria	W. Cough	Fever.	Diarrhœa.
Amherst Street	...	...	...	...	...	...	...
Atlas Terrace...	...	...	...	...	1	...	...
Bromsgrove Street .	...	...	...	...	1	...	...
Bradford Street	...	...	1	...	...	...	...
Clive Road.....	...	...	...	...	...	1	...
Conybeare Road ..	...	...	...	...	...	...	1
Ely Common	...	...	...	..	...	...	1
Glamorgan Street ...	...	...	...	...	...	...	1
Glynn Street	...	...	...	...	...	...	1
Harvey Street	...	...	...	...	...	1	...
Halket Street.....	...	...	...	...	2	...	...
Knole Street	...	...	...	...	...	...	1
Kent Street	...	...	...	...	...	1	...
Leckwith Road	...	...	...	...	...	1	1
Llandaff Road	...	...	...	...	1	...	2
Morgan Street, South	...	...	...	...	...	...	1
Picton Place	...	...	...	2	...	1	...
Wyndham Road ...	...	...	...	...	...	1	...
Wellington Street	...	...	...	...	1	...	2

TABLE C.

Years	1875		1876		1877		1878		1879		1880		Mean of six years		1881	
Estimated Population	70,487		73,075		75,663		78,251		80,839		83,427		76,957		86,015	
7 Chief Zymotic Diseases:	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate
Small Pox	1	0·014	1	0·013	3	0·039	1	0·012	...	...	1	0·011	1·1	0·013	2	0·023
Measles	4	0·056	8	0·109	126	1·665	3	0·038	10	0·123	67	0·803	36·3	0·465	1	0·011
Scarlatina	132	1·872	201	2·750	30	0·396	10	0·127	44	0·544	29	0·347	74·3	1·006	20	0·232
Diphtheria	11	0·155	10	0·136	1	0·013	12	0·153	9	0·111	10	0·119	8·8	0·114	12	0·139
Whooping Cough ...	38	0·539	25	0·342	40	0.528	70	0·894	20	0·247	77	0·922	45·0	0·557	58	0·673
Fever	38	0·539	25	0·342	36	0·475	28	0·357	21	0·259	23	0·275	28·5	0·374	21	0·244
Diarrhœa	70	0·993	69	0·944	19	0·251	73	0·932	33	0·408	99	1·186	60·5	0·785	50	0·581
Total	224	4·168	339	4·636	255	3·367	197	2·513	137	1·692	306	3·653	254·6	3·338	164	1·903

From this table it will be seen that there was a gradual and progressive improvement throughout the whole of the six years, and this improvement was especially maintained in 1881.

Small Pox.—The first of these diseases to which I shall direct your attention is small pox. Nine cases of sickness were reported to me during theyear. Seven cases were imported, and two occurred among the inhabitants of the district. The history of these cases was as follows :—

On the 14th of March the s.s. Waterloo arrived at this Port from Havre, having a sick seaman on board. On visiting the ship I found it was a case of small pox. The sick man was immediately removed to the Hamadryad Hospital Ship. I then examined the remainder of the crew, and found them in good health, but, as a matter of precaution, requested them to be re-vaccinated. This was done, and in all cases the operation was more or less effective. The ship was afterwards thoroughly disinfected alternately with the fumes of burning sulphur and with chlorine gas, especially the cabin occupied by the sick man, and the bedding was destroyed. The vessel, while it remained in port, was kept under observation ; but no fresh case of sickness occurred. The man removed into the hospital had the disease in a confluent form, and ultimately recovered.

On the 15th of March the barque Italia arrived in the Penarth Dock ; and from information received through the Custom House authorities, I visited the ship, and learned that a sick seaman had been taken on shore by the captain, and conveyed to the Seamen's Hospital in a public carriage, where it transpired that the man was suffering from small pox. I, therefore, examined the crew, 15 in number, and requested them all to be re-vaccinated, and they acquiesced in my suggestion. The ship was also thoroughly disinfected, it was isolated, and communication with the shore, as far as practicable, prohibited. The crew were kept under constant observation for nearly a month ; but no further case of small pox occurred. The sick man in the hospital recovered. At my request, for the purpose of protecting the public health, proceedings were instituted against the captain for illegally exposing one of his crew while suffering from small pox ; but as he pleaded ignorance, and as this was the first case of a like character, he was discharged with a caution.

On the same day a seaman who had just arrived in a vessel from Bilboa, not feeling well, left his ship and went to a boarding house in Bute Street. The following day he sought advice at the Seamen's Hospital ; and the medical superintendent, observing an eruption on the skin, very properly detained him there. The disease proved to be small pox in a confluent form. I visited the boarding house, and

placed it under sanitary supervision. The bedding used by the sick man was destroyed, the room occupied thoroughly disinfected, and no one was allowed to use it until it was certified to be free from infection. The proprietor was forbidden to receive any fresh boarders, and those already in the house—four in number—were re-vaccinated. No fresh case occurred there.

On the 7th of May, the ship Ramayes arrived in Penarth Roads from Havre, having a seaman on board suffering from small-pox. The captain had removed him in a boat to the pier-head and from thence in a public cab to the hospital, where he died. Another seaman left the ship and went to a house in Crichton Street, where he was followed, and not appearing to be well I prevailed upon him to go into the hospital. Small-pox afterwards developed itself, but he recovered. The ship was in the dock only a few hours and left for Havre before it could be examined. The French Consul was communicated with, who telegraphed to Havre, where, on the arrival of the ship she was placed in quarantine. Some time afterwards the vessel again entered this Port, and at my request proceedings were instituted against the captain for conveying a man suffering from small-pox in a public carriage. The Magistrates considered this a grave offence and inflicted a penalty of £5 and costs.

On the 22nd of August, the s.s. Elaine arrived at the Cardiff East Dock from Bilboa. A day or two afterwards one of the seamen on observing an eruption on his skin went to the hospital, where it was recognized as a case of small-pox and he was admitted as an in-patient—but subsequently died in that institution. The vessel was visited and the same sanitary previsions carried out as were adopted in the other vessels. She remained in dock under observation for a fortnight, and on leaving, the crew were found to be healthy.

On the 30th August, the s.s. Viking arrived at Penarth Dock from the Port of London, having a sailor ill on board. He appeared to have shewn symptons of sickness immediately on leaving that Port. The disease proved to be a case of confluent small-pox. He was conveyed to the hospital ship in your ambulance, and ultimately recovered. The ship was subjected to the usual sanitary previsions and the crew vaccinated, in all cases with more or less effect. When the ship left the crew were in good health.

On the 22nd of August, a case of small-pox was received into the Hamadryad Hospital Ship from the neighbouring parish of Penarth. The history of this case, which is remarkable and very interesting from a sanitary point of view, is as follows :—About a month or five weeks before, a brother whose family resided in Penarth was in London. From the house in which he stayed a case had been removed into the Small-pox Hospital. He felt unwell, and fearing to

be sent into the same institution, hurried home to his family at Penarth. Immediately after his arrival there the disease developed itself, and the medical man who attended, recognizing the nature of the disease, placed himself in communication with me, and on his stating that the patient was in a very critical condition, and unable to be removed, I suggested isolation, and all the available means practicable for preventing the spread of the infection. He had very properly re-vaccinated all the inmates, and as far as he could judge, the operation was taking and did take effect. The patient died, but no other inmate of the house took the disease. Unfortunately a few hours after the death of the patient, the brother, who had not been re-vaccinated visited the house, where he remained a very short time but sufficiently long however to take the disease. He was conveyed immediatetly to the Hamadryad Hospital, in which institution he recovered.

About this time two young females residing in Margaret Street, Bute Docks, incautiously visited one of the nurses of the Hamadryad Hospital, remaining there however only a very brief period. Two or three days afterwards one of them feeling unwell, sent for her family medical attendant. He recognized the patient as suffering from the premonitory symptoms of small-pox, and communicated the fact to me. I visited the house; isolation of the patient as far as practicable was adopted, together with all the other means for preventing the spread of the infection. The sister and the other inmates of the house were vaccinated with marked success. The patient passed through the disease very favourably, and no other case occurred in the house or neighbourhood.

On the 19th of December I received a communication from the medical man in attendance on a young child aged 6 years, suffering from small pox, in Brook Street. I immediately visited the house with him, and obtained the following information:—Ten days before, a relative, residing in Bristol, about to leave for India, came over to see the mother of the patient. He remained in the house one night, returning to Bristol the following day. It appears a few days before a case of small-pox had been removed from the house in Bristol, where he then resided. The child in Brook Street was unvaccinated, and took the infection conveyed by the man. The usual means were again adopted; namely, isolation, disinfection of the house, and vaccination of the inmates. The child had the disease in a confluent form, and recovered; whilst the infection was prevented from spreading either in the house or neighbourhood.

Having directed your attention to the measures taken to prevent the disease being communicated to others, I may add that in every instance directions were given to destroy the bedding used by the

sick. All other articles of value, or wearing apparel likely to retain any infection were removed to the disinfecting chamber and exposed to the action of dry air heated to a temperature of 230° F. In addition to these precautions immediately on receiving information of the occurrence of a fresh case of small-pox, I notified the fact to the public Vaccinator, and accompanied by your Sanitary Inspectors personally visited the locality for the purpose of ascertaining the efficiency of vaccination.

I also moved the Board of Guardians to appoint a Vaccination Committee, to meet monthly, examine the books of the Vaccination Officer requiring that officer personally to attend the meetings of the Committee, and afford such information as it desired. I append two annual returns furnished by the Vaccination Officer for 1879-1880 and 1880-1881.

	1879. July-Dec.	1880. Jan.-June.	1880. July-Dec.	1881. Jan.-June.
Number of Births returned in the "Birth List Sheets" as registered.	1690	1765	1640	1845
Successfully Vaccinated ...	1332	1326	1278	1535
Insusceptible of Vaccination	.....	.....	.....	.....
Dead Unvaccinated ...	149	225	140	150
Postponed by Medical Certificate	72	64	33	27
Removed to districts, the Vaccination Officer of of which has been duly apprised ...	13	15	.....	12
Removed to places unknown or beyond reach; and and cases not having been found	82	65	104	89
Number remaining entirely unaccounted for ...	42	70	85	32

It will be observed that the figures for the latest period (January to June, 1881) shew a considerable improvement in the proportion of successful vaccinations recorded, a result which is doubtless attributable to the increased activity of the Vaccination Officer acting under the direct supervision of this Committee of the Board of Guardians, who devote much care and attention to the subject.

The result of my enquiries enables me to state that vaccination is more effectively carried out than would appear by these returns, and this arises from the circumstance that occupiers of houses among the working classes are constantly migrating from one part of the town to another, without leaving any information as to their new abodes. This remark especially applies to the Irish labourers, who form a large portion of our population. Many of the original vaccination papers are lost, no communication from the Vaccination Officer reaches them, and any personal enquiry is almost as hopeless. It follows, therefore, that many children among this class are vaccinated, but no report of the fact is made to the Vaccination Officer, hence it does not appear in the column of successful vaccination, but many of them are included in the column "removed to places unknown, and cases not having been found."

The following is the result of my enquiries as to the state of vaccination in certain localities of this district :—

No. of children examined	1715
Number of Successful Vaccination Cases.	
A. with 4 marks.	440
B. with 3 marks.	644
C. with 2 marks.	456
D. with 1 mark.	60
Number of children with unsatisfactory marks.	67
Number of children unvaccinated.	48

I would now point out to your Board, and through you direct public attention to the practical result following the employment of re-vaccination adopted towards those in immediate contact with the patient in every case of small-pox that came under my observation, and at the same time, in accordance with the desire expressed by the Vaccination Committee of the Board of Guardians, make some few remarks which might possibly give greater confidence in the protective value of vaccination :—

As regards re-vaccination, the opportunities were very favourable for testing its effect. The seamen coming under my notice were all taken ill a few days after leaving the Port whence they sailed; and on enquiry I invariably found the entire crew to be apparently in good health.

The passages occupying only a few days, the disease would, on reaching this Port, be generally in its premonitory stage, and in no case would it be beyond the first day or two of the eruptive stage and certainly before any elimination of morbific poison could be thrown off by the skin.

The result of re-vaccination shews that at least 75 per cent of cases give evidence of the lymph taking effect, varying from a slight efflorescence to a well developed vesicle. Of the cases occurring in the district, the same favorable opportunity was afforded, and on every occasion no second case of small-pox occurred.

As regards the protection to be expected from vaccination, I will endeavour to give a scientific explanation of why vaccination gives immunity for a time to those who may become exposed to the infection of small-pox.

For this purpose I would point out that every abnormal condition of the human frame is produced by a specific cause, and by it alone; thus a blow, according to its degree of violence, will produce a fracture or a contusion, and nothing else. Tuberculosis will give rise only to a form of struma, and not to cancer. Exposure to cold will give rise to some inflammatory attack, or to a catarrh, while the infection of scarlatina will produce scarlatina and not whooping-cough.

The eruptive diseases, as popularly understood, based on the result of observation, possess this speciality, that a previous attack will give a greater or lesser degree of immunity to a subsequent attack, and furthermore the immunity is in a degree of ratio to the severity of the first attack. Arguing on these premises, I will, therefore, inferentially state as a matter of fact that small-pox and cow-pox are essentially one and the same disease, the latter being modified in its degree of severity in passing through the system of the cow. The immunity of infection from small-pox is more limited in time when that immunity is due to the milder form of the disease (cow-pox) than it would have been if it were due to the severer form of small-pox; but for the time the insusceptibility continues the one is equally as perfect as the other. In view of the theory that according to the degree of severity or constitutional disturbance produced during the primary attack a greater or a lesser degree of protection results, I may state that according to the experience of such highly scientific authorities as Mr. Marson, of the Small-Pox Hospital; Mr. Simon, late Medical Officer of Privy Council, and others.—"A distant connection subsists between the *number* and the *quality* of the cicatrices and the protection conferred by vaccination against small-pox, so that it may be confidently stated that vaccination is the most efficient from which the most and the best cicatrices result."

These facts have been tabulated by Mr Simon in the following form as the result of observations made during twenty five years in six thousand cases of small-pox contracted after vaccination, the persons having been vaccinated in different ways as regard the *number* and quality of the cicatrices:

Cases of Small Pox classified according to the Vaccination Marks or Cicatrices borne by each Patient respectively.	Number of Deaths per cent in each Class respectively
Class I.—Stated to have been vaccinated, but having no cicatrix.....	21¾
,, II.—Having one vaccine cicatrix	7½
,, III.—Having two vaccine cicatrices.....	4⅛
,, IV.—Having three vaccine cicatrices	1¾
,, V.—Having four or more vaccine cicatrices	¾
Unvaccinated	35½

I will illustrate the foregoing by the following typical case which came under my own observation. Some time ago I was sent for to a neighbouring district to see a patient suffering from an eruption on the skin. From the description given me I had reason to suspect small-pox, so I took vaccine lymph with me. I found a young man in the first stage of small-pox eruption, and in the same room was a married sister suckling her infant. The mother was much pitted from an attack of small-pox, which she had when young. With the exception of the mother, who was not done for obvious reasons, I vaccinated everybody in the house, including the infant.

A fortnight afterwards I was sent for to see this woman, who was very ill, highly feverish, and complained of severe headache, and great pain in her back. When I saw her she was giving her infant the breast, hoping thus to relieve her head. The following day the eruption of small pox appeared; but the child, who had been successfully vaccinated, and up to my visit had been kept at the breast, did not take the disease.

I would now allude to an argument used by some opponents of vaccination, that children who were vaccinated have on some occasions suffered an eruption on the skin, and this was considered the result of using impure lymph.

The following incidents will, I think, illustrate my answer to the above. Two lads meet with a fall, each receiving a considerable contusion of the knee, and they both for a few days suffer much pain. This gradually subsides in one case, whilst, in the other strumous disease, or white swelling, supervenes.

Two women receive a blow on their breast, and each suffer acute pain at the time. In one case it passes away, whilst in the other cancer is developed.

Five children are vaccinated with the same lymph; four of them pass satisfactorily through the various stages of vaccination, whilst, in the fifth case, a troublesome eruption breaks forth.

Inferentially, I would urge that the violence to the knee, the blow on the breast, and the application of vaccine simply excited a latent morbid condition that required only some specific cause to develop itself. The introduction of the vaccine lymph did not give rise to the specific disease because it was impure, but the disease was latent and only required the constitutional disturbances set up by the cow-pox to bring it into activity.

Measles.—There was only one death registered from this disease. This was in January, and was probably the last of an epidemic that had extensively prevailed during the previous year.

Scarlatina.—This disease was fatal in only 20 cases; being at the low rate of 0·23 per 1000, as against 0·83, the mean death-rate of the Kingdom. The deaths were registered thus: 5 in January, and 2 in February. These, like the case of measles above stated, were the last of an epidemic of the previous year, as no fresh case occurred until May, when 2 deaths were registered. After this there was again an interval of nearly 3 months when 1 death was registered. No more occurred until October, when the disease began to assume more of an epidemic form, 2 deaths taking place in that month, 4 in November, and 4 in December.

Throughout the whole of the year Scarlatina prevailed in an extensive and fatal form in many localities of the north-eastern part of this county, but in this district only to the limited degree I have just recorded.

To prevent as far as possible all spreading of the disease, I adopted the following sanitary previsions. With the assistance of many of my professional brethren, who kindly reported to me all cases coming under their observation, I placed myself in communication with the head of a family, or the occupier of an infected house, in whose establishment the case of Scarlatina occurred, and enjoined them under no circumstances to permit any of their children to attend school; and in the possible contingency of these instructions being disregarded, I notified to the master of the school where they attended the necessity to decline receiving them. Isolation of the sick was enforced in every possible way, and the free use of disinfectants in the room enjoined. Sheets saturated with disinfecting fluids were suspended around, over, and below the doorway, in order to protect the active germs of infection from passing through the atmosphere of the house generally. In addition to these precautions, I urged the employment of disinfectants such as a solution of chloromanganate of soda, carbolic acid or Condy's fluid, diffused through the room in the form of vapour by means of a spray distributor to be used by the nurse frequently during the four-and-twenty hours, so as to destroy all organic matter floating in the

atmosphere. When desquamation commenced I recommended the patient to be inuncted with carbolic oil or ozonised ointment, or when these were objected to, the free use of warm baths, with medicated carbolic soap. The clothes and linen of the sick were collected and conveyed to the disinfecting chamber for exposure to the action of dry heated air previous to being sent to wash. After the room ceased to be occupied, it was thoroughly disinfected by means of the fumes of burning sulphur (1lb. to every 1000 cubic feet space) and with chlorine gas, obtained by mixing sulphuric acid, peroxide of manganese, and chloride of sodium (common salt) together.

Diphtheria.—The deaths from Diphtheria were 12, being at the rate of ·139 per 1000, as against ·163 the mean death-rate of the Kingdom.

In former reports I have alluded to the circumstance that sewer exhalations have been a fertile source of communicating this disease—an experience that has been confirmed by the result of personal inquiries during the past year. Out of the 12, I found in seven cases sewer exhalations proceeding from a defective condition of the house drains, or drains in immediate proximity. The cases were mostly single, as only in one house in Blackweir and one house in Canton were there two deaths occurring among members of the same family, and in both instances I found a very defective condition of the privies connected with these houses.

Fever.—The deaths from fever were 21. Of these, four were under the age of five years, and were probably of a remittent kind, and one was registered as typhus fever. This was a young Irishman, aged 19, who was taken ill while residing at a distance from Cardiff. He came to his parents, who lived in Tyndall-street, where he died within five weeks. The others were all enteric or typhoid, and, with one exception, were sporadic, as no second case of sickness of any kind occurred in the house. The death rate from this disease has been 0·24 per 1000, as against 0·54, the mean death rate of the kingdom. This is the lowest death-rate observed since 1875, when the amalgamated district was formed, as shown by table on page 23. It is also satisfactory to find that, out of the 21 cases, only two were registered as having occurred among the Irish population—probably exceeding 13,000 in number; these two cases were the one just alluded to in Tyndall-street, and the other a young child, aged two years, in Pendoylan-street. This favourable result confirms the remarks I made when speaking of the satisfactory condition of the houses of the working classes.

In seven cases I detected sewer gas as the probable excitant cause. In nine no predisposing cause could be discovered,

and it is to these cases I specially referred in my remarks on the food supply.

As regards the 16 cases of enteric fever, they were, with one exception, all sporadic.

The only infectious case came under my observation as follows:—On visiting the house, I found it was that of a respectable tradesman, and there were two cases of sickness at the time—a mother and child: I further learned that a succession of cases had occurred during the previous few weeks. I also was told that when the mother became ill she sent for her sister, who lived in the country, to come and nurse her, but she soon caught the infection, and was obliged to return home. When examining the premises, immediately on opening the door of the kitchen, which separated it from a very small yard, I perceived a very offensive smell which proceeded partly from the privy, and partly from an exposed soil pipe which passed from a workshop abutting on the boundary wall to the floor of the yard. This pipe afterwards received another from the privy just alluded to, and, without the intervention of a trap communicated direct with the drain leading into the main sewer. Just before the vertical soil-pipe reached the ground, an opening existed at one of the joints and allowed the escape of sewer gas. On calling the attention of the occupier to these circumstances, he mentioned that he was constantly observing the same offensive smell, but he wrongly attributed it to an urinal. When this smell was worse than usual he used to throw into the urinal a little disinfecting powder. I gave immediate information to the Town Surveyor who caused the evils to be remedied. I further ascertained that so infectious was the nature of the disease that the mother subsequently died, and on the return of the sister to her home four members of her family caught the disease. They all became very ill, but ultimately recovered.

Whooping-Cough.—The deaths from whooping-cough were 58, the rate being 0·674 per 1,000, that of the Kingdom 0·519. This is a disease essentially incidental to childhood, and prevails at intervals as an epidemic. The mortality produced by it is materially affected by temperature causes. This year it was especially fatal in the autumn and winter seasons. It is a disease over which sanitary provisions have little control, inasmuch as the lengthened period that it usually takes in its individual course precludes any possibility of separating the sick from the healthy.

Diarrhœa.—The deaths from diarrhœa were 50, the death rate 0·581, that of the Kingdom 0·873. It was, therefore, much below the average. Of the 50 deaths, 42 were infantile, and these occurred chiefly during the summer months.

Constitutional Diseases.—The deaths from constitutional diseases were 296, being at the rate of 3·441 per 1,000, that of the Kingdom 4·113. These diseases are amenable to sanitary improvements only as far as the latter improve the general health. It is satisfactory to find that the mortality from phthisis and strumous diseases shows a diminishing death rate.

Local Diseases.—The deaths from local causes were 725, being at the rate of 8·848 per 1,000, that of the Kingdom 8·733. The mortality from these diseases was greatly influenced by temperature, and was excessively high during the months of January, February, and March, as was alluded to when speaking of the meteorological influences affecting the public health.

Developmental Diseases.—The deaths registered under the head of developmental diseases were 210, the death rate 2·441 per 1,000, that of the Kingdom 3·468. The remarks made above on constitutional diseases are applicable to this class also.

Violent.—The deaths from violence were 103, and at the rate of 1·197 per 1,000, that of the Kingdom 0·759. The deaths from these causes in Cardiff have usually been in excess of the Kingdom, and is due to the circumstance that a large proportion of our working classes are exposed to the risk of accident incidental to the special character of their work.

The following is a summary of the sanitary duties discharged during the year :—

7,656 day and 1,841 night visits were made by the Inspectors of lodging-houses, and the condition dnly reported to your Medical Officer of Health.

99 houses were reported as being over-crowded, in each case notices were served upon the occupiers and complied with.

330 houses were found in a condition requiring to be cleansed and lime-washed. The occupiers of these houses were furnished on loan with lime-brushes and other necessaries for cleansing and purifying them.

92 houses were fumigated with sulphurous acid and chlorine gases after fever aud other zymotic diseases, and the bedding and clothes belonging to the sick were exposed to the action of dry air heated to a temperature exceeding 240 degrees Fahr.

380 house and surface drains in a defective state were remedied.

43 cesspools were emptied in accordance with Bye-Laws.

127 cattle-sheds were cleansed and lime-washed.

283 accumulatious of house and refuse matter near dwellings were ordered to be removed.

8 wells were peremptorily closed by order of Magistrates, the water being polluted and unfit for dietetic or domestic purposes.

The owners of eight houses without proper water supply were ordered to obtain the same from the Public Water Works.

Five carcases of mutton and three of beef were seized, as being unfit for food (in all amounting to 1,284 lbs.), and destroyed by order of Magistrates.

PORT SANITARY AUTHORITY.

I have to report that the progressive annual increase in the amount of shipping entering this Port during the present, as compared with preceding ten years has been maintained, as will be seen below :—

Year	No. of Vessels Inwards		Total No. of Vessels Foreign and Coastwise.	Tonnage		Total Tonnage Foreign and Coastwise Inwards
	Foreign	Coastwise		Foreign	Coastwise	
1872	4,942	6,994	11,836	1,957,897	600,805	2,552,702
1873	4,694	6,674	11,368	1,920,410	640,089	2,560,499
1874	4,966	6,213	11,176	2,113,987	545,692	2,659,679
1875	4,645	5,541	10,186	1,947,265	493,818	2,441,083
1876	5,511	6,957	12,468	2,367,307	601,240	2,963,547
1877	5,625	6,661	12,286	2,542,210	586,773	3,128,983
1878	5,867	7,138	13,005	2,821,409	613,845	3,335,254
1879	5,761	6,958	12,719	2,944,565	635,613	3,580,178
1880	6,609	7,117	13,726	3,664,567	667,696	4,332,263
1881	5,592	6,853	12,845	3,672,019	705,105	4,377,124

A strict supervision is exercised over all vessels entering the Ports of Cardiff or Penarth by the Officials acting under the Pilotage Board and Custom House authorities, who are instructed to put certain questions to the Captains of vessels immediately they come under their respective observations, namely :—Whether any seamen has been ill or died during the passage? Whether any seamen is ill at the then present time? In the event of any answer being in the affirmative, the circumstance is immediately reported to me and dealt with accordingly. I then communicate to the Collector of Customs and Dock Master, informing them respectively the measures necessary to prevent any spread of infectious disease, if such exist, and all sick seamen are immediately conveyed to the Hamadryad Ship.

This Institution is supported by a voluntary *pro rata* contribution from shipping on entering the docks—and all seamen are taken into the Institution and medically treated and maintained free of charge, the contributions being equal to the expenditure.

The following cases were admitted into the hospital during the year:—

Diseases.	Cases.	Deaths.
Small Pox	7	2
Fever (Typhoid) ...	14	2
Diarrhœa and Dysentery	5	—
Ague	10	—
Acute Rheumatism ...	28	—
Phthisis	20	6
Bronchitis, Pleurisy, Pneumonia	32	7
Heart Disease	3	—
Injuries	131	5
Other Diseases	243	3
	493	25

The number of vessels reported as having sick seamen on board and medically inspected were 85; those in a condition requiring sanitary regulations were 14; number of chests and bags of clothing belonging to deceased seamen who had died in transit on passage from infectious diseases such as cholera, yellow fever, and small pox, 16; number of vessels disinfected by your Sanitary Inspector, 32; number disinfected in accordance with instructions of Medical Officer by the Master of the ship, 43.

In conclusion, I can again testify to the very careful manner in which Messrs. James & Gover, your Sanitary Inspectors, have discharged the responsible duties delegated to them by myself.

I have the honour to be, Gentlemen,

Your obedient Servant,

H. J. PAINE, M.D

Medical Officer of Health, Cardiff Urban and Port Sanitary Authorities.

APPENDIX.

CARDIFF URBAN SANITARY DISTRICT.

Deaths registered at several groups of ages from different causes during the year 1881.

CAUSES OF DEATH.	AGES. Under 1 year.	1 and under 5.	5 and under 15.	15 and under 25.	25 and under 60.	60 and upwards	Total	Death Rate in Cardiff per 1000 Inhabitants, 1881.	Mean Death Rate per 1000 Inhabitants of Kingdom for 30 years.
CLASSES.									
I. Zymotic Diseases ...	82	66	12	14	40	8	222	2·580	2·13
II. Constitutional ...	30	36	13	48	149	20	296	3·441	4·113
III. Local Diseases ...	181	73	27	30	268	146	725	8·428	8·733
IV. Developmental Diseases ...	110	7	—	3	17	73	210	2·441	3·468
V. Violent Deaths ...	12	4	3	18	52	14	103	1·197	0·750
Total ...	415	186	55	113	526	261	1556	18·089	18·9
CLASS.									
I. ZYMOTIC DISEASES									
ORDER 1.—MIASMATIC									
1. Smallpox				1	1		2	0·023	0·022
2. Measles			1				1	0·011	0·414
3. Scarlet Fever (Scarlatina)	1	15	4				20	0·232	0·830
4. Diphtheria ...		6	5	1			12	0·139	0·163
5. Quinsy		1					1	0·011	0·015
6. Croup	2	8	1				11	0·127	0·228
7. Whooping Cough ...	35	22	1				58	0·674	0·519
Typhus Fever ...					1		1	0·011	0·071
8. Enteric or Typhoid Fever		4		8	6	18	36	0·209	0·341
Simple continued Fever					2		2	0·023	0·129
9. Erysipelas	2			1	6	3	12	0·139	0·096
10. Puerperal Fever (Metria)					3		3	0·034	0·061
11. Dysentery					1		1	0·011	0·060
12. Diarrhœa... ...	33	9			4	4	50	0·581	0·873
13. Ague					1		1	0·011	0·006
14. Remittent Fever ...	1						1	0·011	0·013
15. Rheumatism				3	5		8	0·093	0·116
ORDER 2.—ENTHETIC.									
1. Syphilis	7				3		10	0·116	0·066
2. Stricture of Urethra ...					2	1	3	0·034	0·010
ORDER 3.—DIETHETIC.									
1. Purpura and Scurvy ...		1					1	0·011	0·020
2. Alcoholism { a. Del. Tremens					4		4	0·046	0·022
{ b. Intemperance					1		1	0·011	0·018
ORDER 4.—PARASITIC.									
1. Thrush	1						1	0·054	0·011
Totals	82	66	12	14	40	8	222	80	2·13
CLASS									
II. CONSTITUTIONAL DISEASES									
1. Gout... ...					1		1	0·011	0·017
2. Dropsy	1				1		2	0·023	0·245
3. Cancer				22	14	36	0·416	0·390	
4. Cancrum Oris (NOMA) ...			1	1			2	0·023	0 006
5. Mortification					2	2	0·023	0·064	
6. Scrofula	2	3	3	3	2		13	0·151	0·141
7. Tabes Mesenterica ...	8	8	2		2		20	0·232	0·290
8. Phthisis	4	2	4	42	120	4	176	2·046	2·494
9. Hydrocephalus	15	23	3	2	1		44	0·511	0·363
Totals	30	36	13	48	149	20	296	3·441	4·133
CLASS									
III. LOCAL DISEASES.									
ORDER 1.—DISEASES OF NERVOUS SYSTEM.									
1. Cephalitis		1			2		3	0·034	0·213
2. Apoplexy				3	20	18	41	0·476	0·490
3. Paralysis			1		11	15	27	0·313	0·489
4. Epilepsy	1	2	1		4	1	9	0·104	0·115
5. Convulsions	84	22		1			107	1·243	1·224
6. Brain Diseases		1	1		11	7	20	0·232	0·240
ORDER 2.—DISEASES OF CIRCULATION.									
1. Pericarditis				1	1		2	0·023	0·029
2. Aneurism					1	3	4	0·046	0·023
3. Heart Disease		1	6	10	59	31	107	1·243	0·973
ORDER 3.—DISEASES OF RESPIRATORY ORGANS.									
1. Laryngitis					3		3	0·034	0·070
2. Bronchitis	67	29	3	1	47	36	183	2·127	1·745
3. Pleurisy			2		4		6	0·069	0·047
4. Pneumonia	21	13	2	7	35	10	88	1·023	1·142
5. Asthma					2	2	4	0·046	0·188
6. Lung Disease	2	2	1		5	2	12	0·139	0·202
ORDER 4.—DISEASES OF DIGESTIVE ORGANS.									
1. Gastritis					2		2	0·023	0·038
2. Enteritis		1		1			2	0·023	0·155
3. Peritonitis			2	2	6		10	0·116	0·078
4. Hernia						1	1	0·011	0·043
5. Ileus			2		1		3	0·034	0·060
6. Intussusception					2		2	0·023	0·014
7. Stricture of Intestines ...				1			1	0·011	0·014
8. Stomach Disease ...	1				4	1	6	0·069	0·126
9. Pancreas Disease ...					1		1	0·011	0·000
10. Hepatitis					1	1	2	0·023	0·067
11. Jaundice	3				3	1	7	0·081	0·070
12. Liver Disease					16	4	20	0·232	0·247
ORDER 5.—DISEASES OF URINARY ORGANS.									
1. Bright's Disease (Nephria) ...		1	3	2	21	8	35	0·406	0·096
2. Diabetes			1		2		3	0·034	0 030
3. Cystitis					2		2	0·023	0·018
4. Kidney Disease			1	1		1	3	0·034	0·114
ORDER 6.—DISEASES OF ORGANS OF GENERATION.									
1. Ovarian Dropsy						3	3	0·034	0·011
ORDER 8.—DISEASES OF INTEGUMENTARY ORGANS.									
1. Phlegmon	2		1			1	4	0·046	0·025
2. Ulcer					2		2		
Totals	181	73	27	30	268	146	725	8·428	8·733
CLASS.									
IV. DEVELOPMENTAL DISEASES									
ORDER. 1.—DISEASES OF CHILDREN.									
1. Premature Birth ...	41						41	0·476	0·584
2. Cyanosis	1						1	0·011	0·022
3. Spina Bifida	2						2	0·023	0·018
4. Other Malformations ...	3						3	0·034	0·023
5. Teething	5	1					6	0·069	0·204
ORDER 2.—DISEASES OF ADULTS									
1. Child Birth				3	12		15	0·174	0·108
ORDER 3.—DISEASES OF AGE.									
1.—Old Age						70	70	0·813	1·331
ORDER 4.—DISEASES OF NUTRITION.									
1. Atrophy and Debility ...	58	6			5	3	72	0·837	1·173
Totals	110	7		3	17	73	210	2·441	3·468
CLASS.									
V. VIOLENT DEATHS.									
ORDER. 1.—ACCIDENTS OR NEGLIGENCE.									
1. Fractures and Contusions ...	1	2	2	12	21	2	40	0·465	0·285
2. Gunshot Wounds					1		1	0·011	0·004
3. Cut, Stab					1		1	0·011	0·005
4. Burns and Scalds ...	4					1	5	0·058	0 106
5. Drowning	1	1	1	5	15		23	0·267	0·148
6. Suffocation					1		1	0 011	0·071
ORDER 2.—ACCIDENTS OR NEGLIGENCE—HOMICIDE.									
1. Murder and Manslaughter ...	2			1		1	4	0·046	0·014
ORDER 3.—SUICIDE.									
1. Cut, Stab					1		1	0·011	0·013
2. Poison					1		1	0·011	0·007
3. Hanging						2	2	0·023	0·002
4. Not classed	4	1			11	8	24	0·279	0·104
Totals	12	4	3	18	52	14	103	1·197	0·750

Table of Deaths during the year 1881, in the Urban Sanitary District of Cardiff.

(A)

Classified according to Diseases, Ages, and Localities, and shewing also the Population of Such Localities, and the Births therein during the Year.

(1.) Names of Localities (being Parishes, Groups of Parishes, Townships, Wards or other areas of known population adopted for the purposes of these Statistics; public institutions being excluded.	Population at all Ages.	Registered Births	Mortality from all causes, at subjoined Ages.							Mortality from subjoined causes, distinguishing Deaths of Children under Five Years of Age.																			
																Continued Fevers.											
	Census 1881.		At all ages.	Under 1 year.	1 and under 5	5 and under 15	15 and under 25	25 and under 60	60 and upwards.		Smallpox.	Measles.	Scarlatina.	Diphtheria.	Croup (not Pseudo-Mem.).	Whooping Cough.	Typhus.	Enteric or Typhoid.	Other Specified.	Diarrhœa and Dysentery.	Cholera.	Rheumatic Fever.	Erysipelas.	Pyæmia.	Puerperal Fever.	Ague.	Phthisis.	Bronchitis, Pneumonia and Pleurisy.	Heart Disease.	Injuries.	Other Diseases.
1.	2	3.	4.	6.	5.	7.	8.	9.	10.	12.	13.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23	24.	25.	26.	27.	28.	29.	30.	31.	32.
District of Cardiff	85,378	3,145	1348	400	180	53	87	415	213	Under 5			16	6	10	37		4		35			2				5	92	1	15	337
										5 upwds.		1	4	6	1	1	1	12	2	7		8	8	1	3		138	63	95	58	359
Public Institutions. Infirmary			37		1		9	24	3	Under 5																					1
										5 upwds.																	2	2	2	19	11
Hamadryad, Seamen's Hospital			23				7	16		Under 5																					
										5 upwds.	2							2					2				6	1		5	5
Union			147	15	5	2	10	70	45	Under 5										7							1	4		1	7
										5 upwds.										2			2				80	18	9	4	62
Gaol			1					1		Under 5																					
										5 upwds.																					1
Totals			1556	415	186	55	113	526	261	Under 5			16	6	10	37		4		42			2				6	96	1	16	345
										5 upwds.	2	1	4	6	1	1	1	14	2	9		8	12	1	3		176	84	106	86	438

Table of New Cases of Sickness, coming to the knowledge of the Medical Officer of Health, during the year 1881, in the Urban Sanitary District of Cardiff.

(B.)

Classified according to Localities and Diseases.

NAMES OF LOCALITIES.	New Cases of Sickness, in Persons belonging to the District, distinguishing those in Children under Five Years of Age.																				
							Continued Fevers.														
		Smallpox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	Typhus.	Enteric or Typhoid.	Other Specified.	Diarrhœa and Dysentery.	Rheumatic Fever.	Erysipelas.	Pyæmia.	Ague.	Other Diseases, such as Chicken Pox, or Pseudo-mata, which the Medical Officer of Health thinks well to record.						
1.	11.	12.	13.	14.	15.	16.	18.	19.	20.	21.	22.	23	24.	25.	26.	Chicken Pox.	Measles.	Ph. & Pn.	27.		
Workhouse, In	Under 5.				1	15				15									7		
	5 upwards.				1	1	1	3		18		14							71		
„ Out	Under 5.			1		30	1	3		12								2	37		
	5 upwards.			6		20	11	27		42	7	10						2	288		
Infirmary, In	Under 5.									3	8	12	2	6					6		
	5 upwards.																		20		
„ Out	Under 5.					No	reliable	register	kept.												
	5 upwards.																				
Seamen's Hospital, Hamadryad, In	Under 5.	7	1	1	1			14	7	12	27	3		18					84		
	5 upwards.																				
„ Out	Under 5.					No	reliable	register	kept.												
	5 upwards.																				
Other Practice	Under 5.	2		30	3	57		7		45								2	50		
	5 upwards.			11		7		23		8		7						3	413		
Totals	Under 5.			31	4	102	1	10		72								2	50		
	5 upwards.	9	1	18	2	22	12	63	7	83	42	46	2	19				3	413		